

# Mercury & Fish

Regional Tribal Water Plenary  
Meeting #5

*May 22, 2009*

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# Primary Sources of Mercury

## In California:

- **#1: Mercury & Gold mines**
- Energy: coal-powerplant
- Industry: petroleum, refineries, cement kilns, Chloralkali
- Improper disposal: breakage mercury-laden products - landfills, waste combustion & incineration
- Non-point sources: dental offices, thermometers, florescent bulbs, etc.



# Gold & Mercury

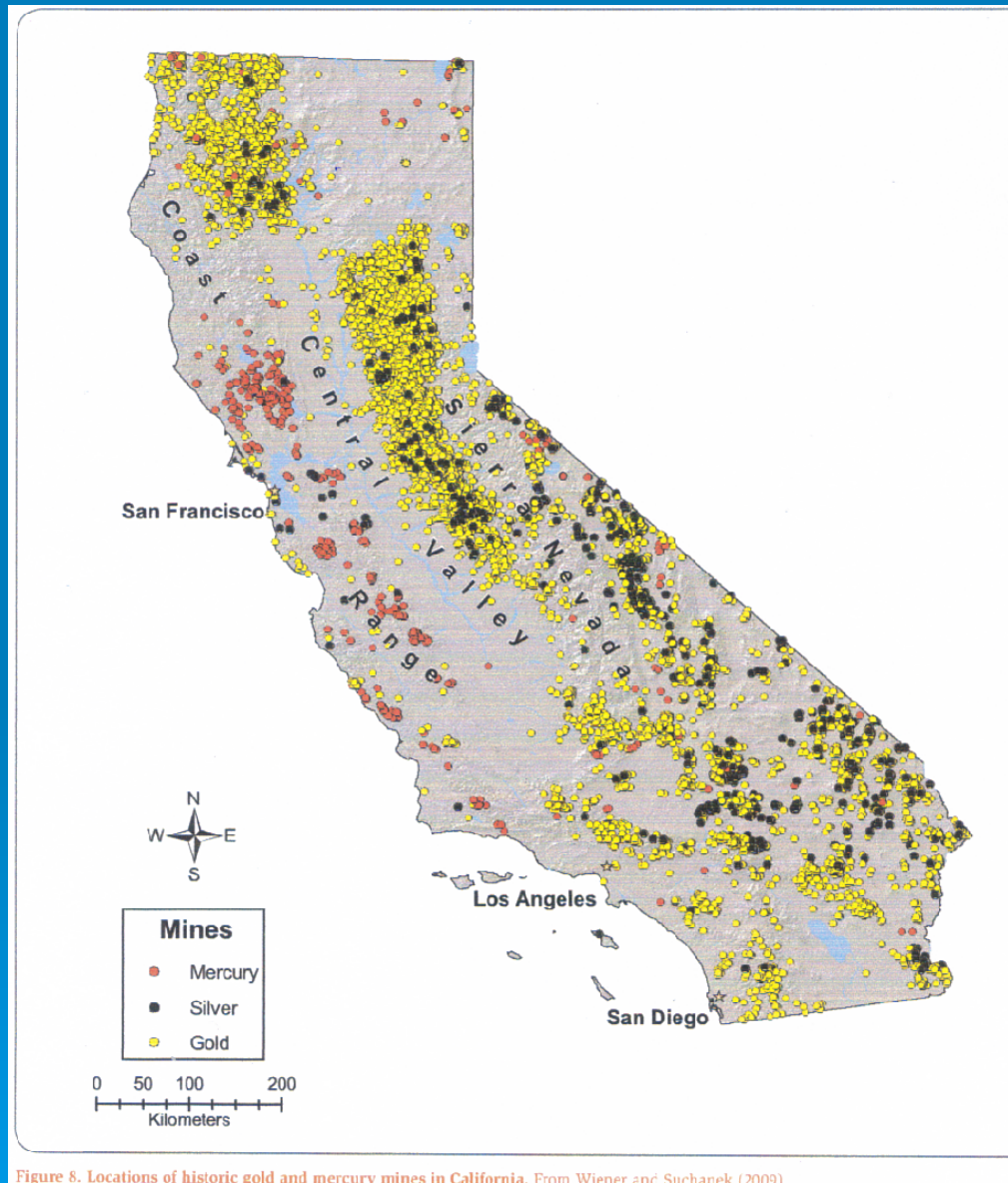


Figure 8. Locations of historic gold and mercury mines in California. From Wiener and Suchanek (2009).

26 million lbs of mercury  
used in California.  
10-30% was lost in  
standard operations.

Est. total mercury lost to  
the environment = 11  
million lbs or more

1 gram (2 thermometers)  
can poison a small lake  
& all it's fish.

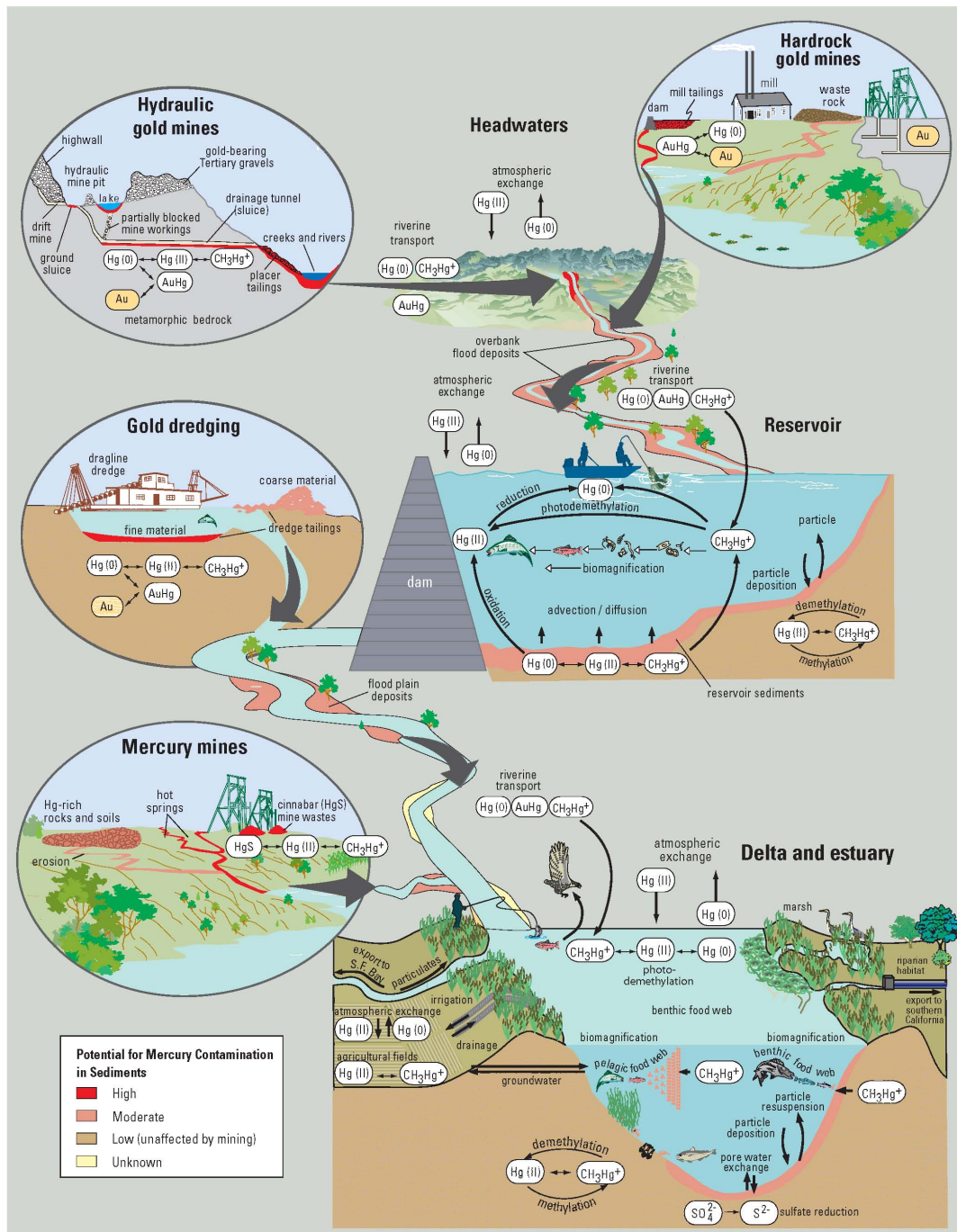
Sources: Alpers 2006 / Wiener and  
Suchanek 2009

# TRANSPORT AND TRANSFORMATION OF MERCURY

Hydraulic & hard rock gold mines – Sierra Nevada

- Mercury mines – Coast Ranges
- Mountain streams above reservoirs
- Foothill reservoirs
- Rivers below reservoirs – gold dredging environments
- Floodplain deposits
- San Francisco Bay-Delta estuary

USGS Fact Sheet 2005-3014





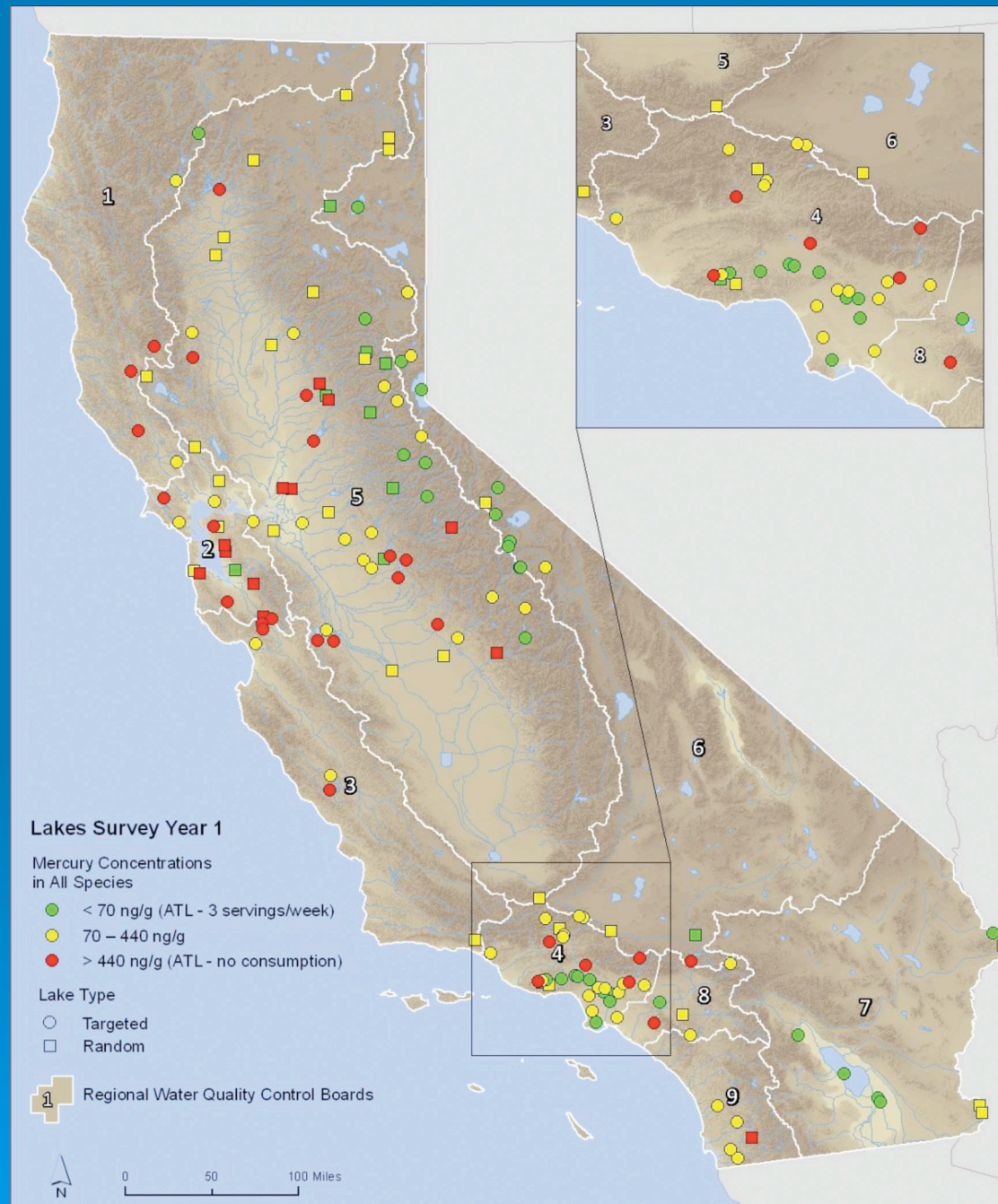
# SWAMP

2007 Lakes & Reservoirs  
Est. 85% not fit for  
human consumption

2008 Continued

2009 Coastal Waters

2010 - ? Rivers & Streams



Source: SWAMP 2008  
[www.waterboards.ca.gov/swamp](http://www.waterboards.ca.gov/swamp)

# Mercury in the human body?



- Neurotoxic & Cytotoxic
- Enters blood & central nervous system (MeHg), including the brain
- Pregnant women, methylmercury crosses into placenta
- Affects developing fetus - teenage yrs.
- Mercury in the body = over a year
- Chemical form matters: Metallic Hg, Organic Hg (Methylmercury), vapor

# Effects Prenatal Exposure

- Birth defects & Brain development
  - Permanent learning disabilities:
    - Attention deficit disorders
    - Language skill deficiencies
    - Seizures & cerebral palsy
    - Disturbances of vision, hearing, sensation
    - Delayed walking & abnormal reflexes
    - Swallowing & sucking
  - Premature births
  - Increased risk of heart attacks later in life
  - Alzheimer's, Autism, Cancers...
- Over 300  
Related  
Symptoms**



# Consuming Fish Safely

- Stored in muscle of entire fish
- Higher Risk - Dietary Staple
- Balance benefits v. negative effects
- If pregnant stop eating certain fish
- Avoid large predatory fish
- Do the math based on weekly amounts...





# Consuming Fish Safely

## How To Do the Math

- EPA RfD is 0.1 µg (microgram) mercury per kg body weight per day.

## Store bought Fish - Consult EPA

- EPA study (FDA issue)  
<http://www.cfsan.fda.gov/~frf/sea-mehg.html>
- Mercury calculators: <http://www.gotmercury.org/>
- Wallet Cards: [www.mercury.org](http://www.mercury.org) [http://www.mercuryaction.org/fish/images/wallet\\_card.pdf](http://www.mercuryaction.org/fish/images/wallet_card.pdf)
- PSR/ARHP/CIEA brochure

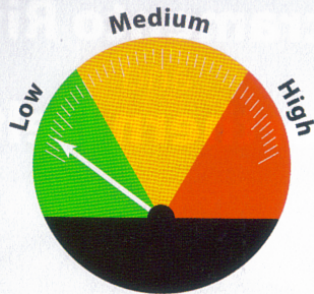


## Caught Fish - Local Advisories

[http://www.oehha.ca.gov/fish/so\\_cal/index.html](http://www.oehha.ca.gov/fish/so_cal/index.html)  
(Based on 145 lb woman)

# A guide to eating fish caught in the Sacramento River and Northern Delta

Women 18 - 45, especially those who are pregnant or breastfeeding, and children 1 - 17



American Shad



Asiatic Clam



Trout ♥



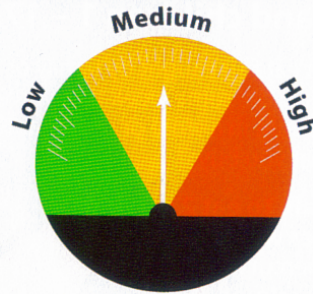
Salmon ♥

♥ = High in Omega-3s

Safe to eat  
3 servings per week

OR

Safe to eat  
1 serving per week



Carp and Goldfish



Sucker



Crappie



Catfish



Bluegill and  
Other Sunfish



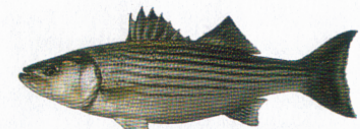
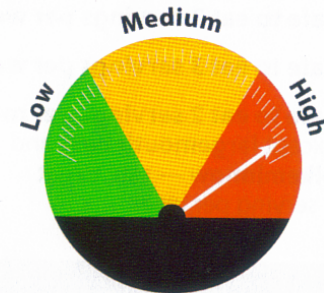
Hitch



Hardhead



Crayfish



Striped Bass



Largemouth Bass



Sturgeon



Pikeminnow

Do not eat  
except **striped bass** under 27 inches or  
**sturgeon** — safe to eat 1 serving per month



# Are you & your family at risk?

- Check Consumer Advisories: do the math
- Check Local Advisories: do the math
- Maps of Gold Mercury Mine sites? Know waterways relation
- Oral History: Ask your local elders, tribal governments, IHS & local government
- Traditional Exposure Routes?  
basketmaking, food gathering, firewood, regalia? Secure safe gathering locations.

# Wild-Caught Salmon!

High in Omega-3 Fatty Acids!

## Benefits:

- help reduce blood cholesterol.
- protects the heart and circulation
- May reduce the risk of heart disease, high blood pressure & certain cancers.
- Aids nervous system development
- Hormonal Balance

## Seafood in general:

- Essential minerals: iron, zinc, iodine, calcium & selenium
- Vitamins that aid in : healthy nerve tissues, strong bones, teeth & complexion.
- Protein for growth & maintenance of muscles & body tissues.

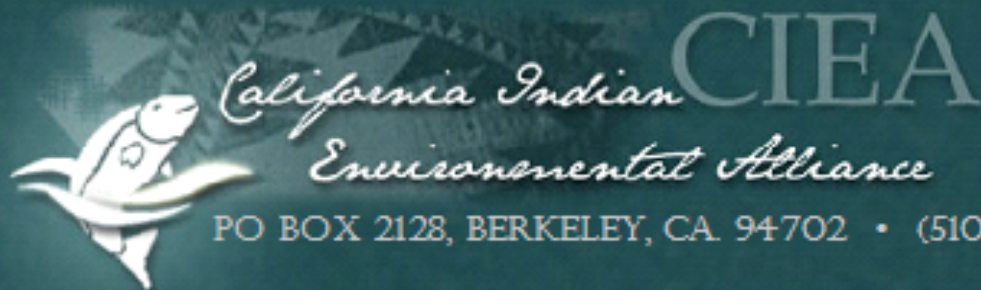




# California Tribal Mining Strategy Meetings

## Workgroups

- Mapping / Sampling
- TMDLs
- Health
- Advocacy – State, National, International
- Science – Outreach



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the National Indian Justice Center*